PROCEEDINGS

OF

THE ROYAL SOCIETY.

1838. No. 33.

April 26, 1838.

STEPHEN PETER RIGAUD, Esq., Vice-President, in the Chair.

A paper was read, entitled, "An Account of a line of Levels, carried across Northern Syria, from the Mediterranean Sea to the River Euphrates." By William Taylor Thomson, Esq., with Geological and Botanical Notes, by William Ainsworth, Esq. Communicated by Captain Beaufort, R.N., F.R.S., &c.

The operation of carrying a line of levels across Northern Syria, from the Mediterranean sea to the river Euphrates, was undertaken by Colonel Chesney, at the time he commanded the expedition sent to that river in the year 1835, chiefly with a view to determine the capabilities of the intervening country for the establishment of communications by roads, railways, or canals; but it was expected also that the examination would afford information of much historical and geographical interest. It was commenced in August of the same year, by Lieutenant Murphy and Mr. Thomson, assisted by Sergeant Lyne, R.E., Gunner Waddell, and some Maltese: but most of the party being disabled by sickness, and their numbers reduced by deaths and removals, the levelling was at length conducted principally by Mr. Thomson, with the assistance, in the latter part of the work, of Mr. Elliott, commonly called Dervish Ali. The result of this great labour was to determine the bed of the Euphrates to be 628 feet above the level of the Mediterranean.

The whole of the district over which the line of levels was carried naturally divides itself into four regions, each of which is characterized by its relative elevation, its peculiar geological structure, its vegetation, and the manners and habits of its population.

The first region, commencing from the Euphrates, comprises the country of the upper chalk and conide limestones, which averages an elevation of 1300 feet, and is but slightly undulated. The soil is light, somewhat stony, and of no great depth, and is highly productive in crops of corn and cotton. These uplands are inhabited by stationary Turcomans and Arabs, who are a mixed race of Fellahs. The large plains of this region are studded over in every direction with numerous mounds, of a more or less circular form, called by the Arabs *Tets*, and by the Turcomans *Heuks*, the origin of which appears to be partly natural and partly artificial. A village is found at the foot of almost every one of these monticules,

The second region comprises the country of ostracite limestone and feldspath pyroxenic rocks, in the valley of Ghuidaries and the Aphrean, having a mean elevation of 450 feet. This district is extremely fertile, for the most part cultivated, and inhabited by agricultural Kurds.

The third region is the lacustrine plain of Umk, elevated about 305 feet above the Mediterranean, and covered, for the most part, with the gramineous plants which feed the flocks of the pastoral and nomadic Turcomans.

The fourth region, formed by the valley of Antioch, is rocky, irregular, and varying from elevations of 220 to 440 feet. It comprises also the alluvial plain of the Orontes, which gradually sinks to the level of the Mediterranean. This latter district is covered with shrubs, which are chiefly evergreens; and inhabited by a few families of Syrians, who, in these picturesque solitudes, chiefly follow mysterious rites, presenting a mixture of Mahomedanism and Christianity.

It appears, from the examination of this line of country, that there here exist two distinct regions, the one low and already furnished with the means of water transport; and the other elevated, where the waters, which are lost in the valley of Aleppo, might be turned with facility into an artificial channel. Both regions are remarkably level, and present, when separately viewed, very few difficulties to be overcome for the construction of artificial roads.

May 3, 1838.

FRANCIS BAILY, Esq., V.P. and Treas., in the Chair.

Thomas Burnet, D.D., Sir James Rivett Carnac, Bart., John Merewether, D.D., Benjamin Fonseca Outram, M.D., Jonathan Pereira, Esq., and Edward Hamilton Stirling, Esq., were severally elected Fellows of the Society.

A paper was read, entitled, "Supplementary Note to the Thirteenth Series of Experimental Researches in Electricity." By Michael Faraday, Esq., D.C.L., F.R.S., &c.

The author describes, in this supplementary note, experiments made with the view of determining the specific inductive capacities of dielectrics, by means of an apparatus of the following form. Three circular brass plates were mounted, side by side, on insulated pillars; the middle one was fixed, but the two outer plates were moveable on slides, so that all three could be brought with their sides almost into contact, or separated to any required distance. Two gold leaves were suspended in a glass jar from insulated wires, connecting each of the leaves respectively with the adjacent outer plate. The amount of disturbance in the electric equilibrium of the outer plates produced by interposing a plate of the dielectric substance to be tried, after charging the middle plate, was taken as a measure of the specific inductive capacity of that dielectric. By varying the size and

distances of the plates, and also the distance of the gold leaves from one another, new conditions are supplied for the more exact determination of the relative inductive powers of dielectrics of every description; and by sufficiently reducing the dimensions of the instrument, it may be rendered applicable to comparatively small masses of dielectrics, such as crystals, and even diamonds. An instrument capable of such universal application the author proposes to designate by the name of *Differential Inductometer*.

Also read, a Letter addressed to P. M. Roget, M.D., Secretary to the Royal Society, by James Ivory, Esq., F.R.S., accompanying a paper on Astronomical Refractions. Communicated by Dr. Roget.

The author adverts in this letter to the attempts made by Newton to solve the problem of atmospherical refractions, which were baffled by the experience that the observed quantities fall far short of the theoretical deductions; whence he justly inferred that some new cause must be sought for capable of effecting that change in the density of the lower part of the atmosphere which is required for reconciling theory with observation. It becomes necessary, in particular, to investigate the law according to which the temperature diminishes as the height increases. The initial value of the rate of diminution has to be determined by experiment; and the introduction of this new element into the equation of an atmosphere in equilibrium must be an approach to the true solution of the problem of the refractions, and is indispensable if arbitrary assumptions are to be avoided. The author proceeds to notice Laplace's solution, which, though highly ingenious, is nevertheless hypothetical; and he adverts to the want of precision exhibited in Biot's dissertation on the influence which the presence of aqueous vapour in the air has on the refractions: but refers to the paper which accompanies his letter for the further explanation of his views on this subject.

A paper was also in part read, entitled, "On the Theory of the Astronomical Refractions," by James Ivory, Esq., K.H., M.A., F.R.S., &c.

May 10, 1838.

FRANCIS BAILY, Esq., V.P. and Treas., in the Chair.

The reading of Mr. Ivory's paper "On the Theory of Astronomical Refractions," was resumed.

The Society then adjourned, in consequence of the 17th having been fixed for celebrating Her Majesty's Birth-day, to meet again on the 24th instant.

May 24, 1838.

FRANCIS BAILY, Esq., V.P. and Treas., in the Chair.

His Imperial and Royal Highness Leopold II., Grand duke of Tuscany, was elected a Fellow.

The reading of the paper by Mr. Ivory, "On the Theory of the Astronomical Refractions," was concluded.

In this communication, the author, after stating that the mean refractions are the object of investigation, and fully defining what he understands by this term, gives an historical review of what has been done up to the present time on this very important subject. Having stated that the foundation of the theory of astronomical refractions was laid by Dominique Cassini, he deduces on Cassini's hypothesis (that of an homogeneous atmosphere) a formula for the refraction, which agrees exactly with that of La Place, employed in computing the first part of the table of mean refractions, published by the French Board of Longitude.

The labours of our immortal countryman Newton, in this vast field of inquiry, are next reviewed. As the density of the atmosphere in ascending decreases gradually, the path described by a ray from a star, in its passage through the atmosphere, is not a straight line, as it would be on Cassini's hypothesis, but is a curve more and more inflected towards the earth's centre. In the Principia there is found whatever is necessary for determining the nature of this curve, and, consequently, for solving the problem of the astronomical refractions, which consists in ascertaining the difference between the direction of light when it enters the atmosphere, and its ultimate direction when it arrives at the earth's surface.

On the principles established in the second section of the Principia, the author deduces equations requisite for the solution of the problem of astronomical refractions, and remarks that these equations are perfectly general, and will apply in any constitution of the atmosphere that may be adopted. In this investigation, in preference to employing functions with peculiar properties to express the molecular action, the manner in which the forces act has been considered. When the light, in passing through the atmosphere, arrives at a surface of increased density, it receives an impulse which may be considered as instantaneous; and this impulse being distributed over the breadth of a stratum of uniform density, ascertains the centripetal force tending to the earth's centre, by the action of which the trajectory is described.

It appears, that Newton himself was the first to apply this new method to the problem of the astronomical refractions. In his first attempt he assumes that the densities decrease in ascending, in the same proportion as the distances from the earth's centre increase. On this supposition the author investigates a formula, which M. Biot has also obtained, and which is equivalent to the construction communicated by Newton to Flamsteed. On this basis a table was computed and communicated to Flamsteed; but Newton subsequent-

ly informed Flamsteed that he did not intend to publish it, in consequence of a serious objection to the supposed scale of densities. Adopting the principles in the twenty-second proposition of the second book of his Principia, Newton, it appears, succeeded at length in computing a second table of refractions, which he likewise communicated to Flamsteed, and which, there is every reason to think, is the same which he gave to Halley, and which was inserted by that astronomer in the Philosophical Transactions for 1721. As the determining whether the two tables are identical is a question of much interest, the author enters very fully into it, and, from the results of elaborate calculations, concludes that Halley's table is no other than the one which Newton calculated on the supposition that the densities in the atmosphere are proportional to the pressures. He remarks that, as far as the mathematics are concerned, the problem of the astronomical refractions was fully mastered by Newton.

After referring to the labours of Brook Taylor, Kramp, and Thomas Simpson, the author again adverts to Newton's views, remarking that, in assigning the rarefaction of the lower region of the atmosphere by heat as the cause why the calculated refractions near the horizon so much exceeded the observed, as was found to be the case, Newton had assigned the true cause; but that he had no clear conception of the manner in which the density in the lower region is altered by the agency of heat; and he considers that nearly the same ignorance in that respect still prevails.

The two atmospheres, with densities decreasing in arithmetical and geometrical progression, which, it now appears, were imagined by Newton, and which have been discussed by Thomas Simpson and other geometers, are found, when the same elements are employed, to bring out horizontal refractions on opposite sides of the observed quantities. La Place conjectured that an intermediate atmosphere which should partake of the nature of both, and should agree with observation in the horizontal refraction, would approach nearly to the true atmosphere. If recourse be had to the algebraical expressions of La Place, it will be found that the atmosphere he proposes is one of which the density is the product of two terms, the one taken from an arithmetical, the other from a geometrical series; the effect of which combination is to introduce a supernumerary constant, by means of which the horizontal refraction is made to agree with the true quantity. The author considers, with Dr. Brinkley, that the French table, founded on La Place's investigation, is only a little less empirical than the other tables, and that the hypothesis of La Place does not appear to possess any superiority over other supposed constitutions of the atmosphere in leading to a better and less exceptionable theory.

After eulogizing Bessel's tables of mean refractions, published in his *Tabulæ Regiomontanæ*, the author refers to his own paper in the Philosophical Transactions for 1823. In this paper the refractions are deduced entirely from the very simple formula,—

$$\frac{1+\beta r'}{1+\beta r''}=1-f\left(1-c^{-u}\right)$$

in which β stands for the dilatation of air or gas by heat, τ' and τ'' for the temperature at the earth's surface, and at any height above it, and c^{-u} for the density of the air at that height in parts of its density at the surface. If this formula be verified at the earth's surface in any invariable atmosphere, by giving a proper value to the constant f, it will still hold, at least with a very small deviation from exactness, at a great elevation; and this is immediately shown.

This manner of arriving at the constitution of the atmosphere is contrasted with the procedure of M. Biot of transforming an algebraical formula, for the express purpose of bringing out a given result. As the problem in the *Mécanique Céleste* is solved by means of an interpolated atmosphere between two others; as in Mr. Ivory's paper of 1823, there is no allusion to such an atmosphere; and as the table in that paper is essentially different from all the tables computed by other methods, he contends that all these must be sufficient to stamp an appropriate character on his solution of the problem. But if ingenuity could trace some relation, in respect of the algebraic expression, between the paper of 1823 and La Place's calculations, he considers that it is not difficult to find, between the same paper and the view of the problem taken by the author of the Principia in 1696, an analogy much more simple and striking. Newton having solved the problem, on the supposition that the density of the air is produced solely by pressure, and having found that the refractions thus obtained greatly exceeded the observed quantities near the horizon, inferred, in the true spirit of research, that there must be some cause not taken into account, such as the agency of heat, which should produce, in the lower part of the atmosphere, the proper degree of rarefaction necessary to reconcile the theoretical with the observed refractions. The author's sole intention, in introducing the quantity f in his formula, is to cause the heat at the earth's surface to decrease in ascending, at the same rate that actually obtains in nature, not before noticed by any geometer, but which evidently has the effect of supplying the desideratum of Newton.

The author considers, that the comparison of the table in the paper of 1823, with the best observations that could be procured at the time of publication, was satisfactory; and after the publication of the *Tabulæ Regiomontanæ*, he found that the table agreed with Bessel's observed refractions to the distance of 88° from the zenith, with such small discrepancies as may be supposed to exist in the observations themselves.

The paper in the Philosophical Transactions for 1823, however, takes into account only the rate at which the densities, in a mean atmosphere, vary at the surface of the earth; but, in the present communication, the author proposes to effect the complete solution of the problem, by estimating the effect of all the quantities on which the density at any height depends. For this purpose, he finds it necessary to employ functions of a particular kind; and then gives a formula, one part of which consists of a series of these functions, for the complete expression of the temperature of an atmosphere in equilibrium; the intention of assuming this formula being to ex-

press the temperature in terms of such a form as will produce, in the refraction, independent parts that decrease rapidly. By this means he proceeds in the analytical investigation of the problem in its more comprehensive form, and deduces two equations on which its solution depends.

The first of these contains the law according to which the heat decreases as the height above the earth's surface increases; and the second determines the perpendicular ascent, when the difference of the pressures and of the temperatures at its upper and lower extremity have been found. If the latter, with a slight transformation, be multiplied by the proper factor, representing the variable force of gravity in different latitudes, it becomes identical with the usual barometric formula, all its minutest corrections included; and it has this advantage; that, whereas the usual formula is investigated on the arbitrary assumption, that the temperature is constant at all the points of an elevation, and equal to the mean of the temperatures at the two extremities, this formula is strictly deduced from the general properties of an atmosphere in equilibrium.

Having determined, from experimental results, the values of certain constants in these formulæ,—first, in an atmosphere of dry air, and, secondly, in an atmosphere of air mixed with aqueous vapour, the author remarks, that the analytical theory agrees in every respect with the real properties of the atmosphere, as far as these have been ascertained.

The object of Mr. Ivory's further investigation is to show, that the same theory represents the astronomical refractions with a fidelity that can be deemed imperfect only as far as the values of particular constants, which can only be determined by experiment, are liable to the charge of inaccuracy. He therefore proceeds to determine, from the formulæ previously deduced, the refraction of a star in terms of its apparent zenith distance. For this purpose, the differential equations are transformed by the introduction of new symbols; the limits of certain terms are determined previously to their being neglected; and the equation is finally reduced to a form, in which the remaining operations consist in investigating the integrals of four expressions, and in subsequently assigning their numerical values. Great skill is displayed in conducting these intricate investigations; and after going through the most laborious calculations and computations, the author exhibits a table of theoretical refractions, deduced solely from the phenomena of the atmosphere, for zenith distances, extending from 10° to 89½°. These refractions are compared with those in Bessel's table, in the *Tabulæ Regiomontanæ*, and also with those in the table in the *Connaissance des Temps*. From this comparison, it appears, that the three tables agree within less than 1″, as far as 80° from the zenith: from 80° to 88° of zenith distance, the numbers in the French table exceed those in Bessel's, the excess being 2″ at 84°, and 4″ at 88°; and with a single exception at 88°, (probably, judging from the character of the adjacent number, arising from an error of computation,) the refractions in the new table are nearer to Bessel's than those in the French table;

but when the zenith distance is greater than 80°, the author considers the accuracy of the French table questionable, both on account of the hypothetical law of the densities, and because the quantity assumed for the horizontal refraction is uncertain.

After giving a few examples, illustrative of the use of the new table, the author inquires how far the refractions are likely to be affected by the term which it was found necessary to leave out, because the present state of our knowledge of the phenomena of the atmosphere made it impossible to determine the coefficient by which it is multiplied. For this purpose, the variable part of that term has been computed for every half degree, from 85° to 88°, and the results are exhibited in a table. From this it appears, that this coefficient, although considerably less than that of the preceding term, may still have some influence on the refractions at very low altitudes. The mean refraction in Bessel's table, and in the new table, can hardly be supposed to differ 2″ from the true quantity, which would limit the coefficient in question to be less than one-tenth. It is a matter of some importance to obtain a near value of this coefficient; and it is probable that this can be accomplished in no other way, than by searching out such values of the two coefficients as will best represent many good observed refractions at altitudes less than 5°. If such values were found, our knowledge of the decrease of heat in ascending in the atmosphere would be improved, and the measurement of heights by the barometer would be made more perfect.

At the end of the paper is given a table of mean refractions for the temperature 50° Fahr. and barometric pressure 30 inches, at every degree from 0° to 70° zenith distance, and at every 10′ from 70° to the horizon; and tables of the corrections requisite for variations of the thermometer and barometer are subjoined.

May 31, 1838.

DAVIES GILBERT, Esq., V.P., in the Chair.

The Rev. John Hymers was duly elected a Fellow of the Society.

A paper was read, entitled, "Remarks on the Theory of the Dispersion of Light, as connected with Polarization." By the Rev. Baden Powell, M.A., F.R.S., Savilian Professor of Geometry in the University of Oxford.

The present paper is a sequel to those already presented by the author to the Royal Society, in which he had instituted a comparison of the observations of the refractive indices for the standard rays of light in various media, with the results calculated from theoretical formulæ, deduced from the most improved views of the undulatory hypothesis; the cases discussed including the greatest range of data as yet furnished by experiment. The comparison exhibited an accordance sufficient to warrant the conclusion that the theory af-

fords a very satisfactory approximation, at least, to the expression and explanation of the actual law of nature. In order, however, to remove any possible discrepancy which may still exist, or hereafter be found to obtain, the author considers that further examination is requisite of the principles on which any extension or modification of the theory might be pursued; and such is the object of the investigation undertaken in the present paper.

The phenomena of interference, on which the undulatory theory was originally based by Dr. Young, obliged us to adopt some idea of an alternating motion, as well as a motion of translation, in our conception of light; and this, with all the accessions it has received, especially from the investigation of Fresnel, has, at the present day, been connected by the labours of M. Cauchy and others, with general dynamical principles, which regulate the propagation of vibratory motions through an elastic medium. From such dynamical principles there have been deduced certain differential equations of motion, the integration of which gives the well-known expression for a wave, involving the relation between the velocity and the wave-length which explains the dispersion. The direct and complete integration of these forms, effected by M. Cauchy, and simplified by Mr. Tovey and M. Kelland, involves certain conditions; namely, the evanescence of certain terms, the interpretation of which implies peculiar views of the constitution of the ether. Mr. Tovey shows that without these conditions, a certain form of the wave-function is a particular solution of the equations; and this form is precisely that expressing elliptically polarized light. If the absence of the condition in question be essential to the case of elliptically and circularly polarized light, it follows that all the preceding investigations, which depend on the fulfilment of those conditions, are applicable only to unpolarized and plane-polarized light, and consequently the general integration is limited in a most material part of its application; a defect which is only remedied by the supplementary investigation of Mr. Tovey, in which, for this case, a particular solution is assigned. It seemed, then, necessary to show explicitly that the non-fulfilment of the conditions, that is, the non-evanescence of the terms in question, is essential for elliptically polarized light, as their evanescence is for common light, and thus to exhibit distinctly the relation between the cases of elliptically polarized, of plane-polarized, and unpolarized light; and, again, to remove, if possible, the obscurity and discrepancy of opinion in which the physical interpretation of those conditions, with regard to the supposed constitution of the ethereal medium, appeared to be involved.

The author then enters upon the analytical investigation of the subject, and in conclusion remarks that when light is elliptically or circularly polarized, that is, when any one of the two component vibrations is retarded behind the other, then, in the differential equations of motion, the opposite terms do not destroy each other in the summation, which they can only do in general by supposing a great number taken into account; that is, the number of terms is limited, or the sphere of the influence of the force by which the vibrations

are propagated is small. When light is plane-polarized, or unpolarized, that is, when there is no retardation, or the phases of the component vibrations are simultaneous, then the opposite sums destroy each other; that is, the number of terms involved is greater, or the sphere of the influence of the force greater. Since both kinds of light can be propagated indifferently through ordinary media, it follows that the sphere of influence of the force, or number of molecules taken into account, does not here depend on the arrangement of the molecules of ether in the medium, but on the retardation of one of the vibrations behind the other, or the absence of it, originally impressed on the ray in the respective cases.

A paper was also read, entitled, "An Experimental Inquiry into the influence of Nitrogen on the Growth of Plants." By Robert Rigg, Esq. Communicated by the Rev. J. B. Reade, M.A., F.R.S., &c.

The author, after briefly alluding to a former paper laid before the Royal Society, describing the chemical changes which occur during the germination of seeds, and some of the decompositions of vegetable matter, proceeds, in the present paper, to trace a connexion between the phenomena exhibited during the growth of plants, and the direct agency of nitrogen. The experiments by which the author supports his views are arranged in separate tables, so drawn out as to indicate not only the quantities of carbon, oxygen, hydrogen, nitrogen, and residual matter, in about 120 different vegetable substances, but also the quantity of nitrogen in each compound, when compared with 1000 parts by weight of carbon in the same substance. The most important of these tables are those which exhibit the chemical constitution of the germs, cotyledons and rootlets of seeds; the elements of the roots and trunks of trees, and the characters of the various parts of plants, especially of the leaves, at different periods of their growth. From this extensive series, which is stated to form but a small portion of the experiments made by the author in this department of chemical research, it appears that nitrogen and residual matter are invariably the most abundant in those parts of plants which perform the most important offices in vegetable physiology; and hence the author is disposed to infer, that nitrogen (being the element which more than any other is permanent in its character) when coupled with residual matter, is the moving agent, acting under the living principle of the plant, and moulding into shape the other elements. The method of ultimate analysis adopted by the author, enables him, as he conceives, to detect very minute errors, and therefore to speak with certainty as to the accuracy and value of every experiment.

A paper was also read, entitled, "Researches in Rotatory Motion." By A. Bell, Esq. Communicated by the Rev. W. Whewell, M.A., F.R.S., &c.

This paper, which is altogether analytical, contains several new theorems in rotatory motion, respecting the effect of the centrifugal force arising from a rotation about any axis, in producing rotation

about another, inclined at any angle to the former; and also a new, and comparatively concise, demonstration of the equations of the motion of rotation of a solid body, its centre of gravity being fixed, and the body being acted on by any forces.

The Society then adjourned over Whitsun-week to meet again on the 14th June next.

June 14, 1838.

His Royal Highness the DUKE of SUSSEX, K.G., President, in the Chair.

A paper was read, entitled, "Researches on Suppuration;" by George Gulliver, Esq., Assistant Surgeon to the Royal Regiment of Horse Guards. Communicated by John Davy, M.D., F.R.S., Assistant Inspector of Army Hospitals.

The author, in consequence of some theoretical views of the suppurative process, was led to undertake an examination of the blood in the different forms of fever accompanying inflammation and suppuration; and the result has been the detection of globules of pus in that fluid in almost every instance where there had existed, during life, either suppuration, or great tumefaction of the external parts without the presence of pus. The means by which he detected pus in the blood were partly chemical, and partly by the aid of the microscope. Availing himself of the solvent power which water exerts on the globules of the blood, while it has no action on those of pus, he had merely to dilute the suspected blood sufficiently with water, by which means the red globules were made to disappear, while those of pus remained at the bottom of the fluid, and were easily recognised by a good microscope. A number of cases are detailed, from which the general result, above stated, was deduced. He considers that his experiments tend to establish the conclusion that suppuration is a kind of proximate analysis of the blood. As the fibrin separated from this fluid produces swelling of the part affected, or is attracted to the contiguous tissue for the reparation of the injury, the globules of the blood, altered by stagnation, become useless, and are discharged as excrementitious matter from the system. Such is the constitution of healthy pus: but when mixed with broken down fibrin, it assumes the flaky and curdled appearance, with proneness to putrefaction, characterising unhealthy pus, and the presence of which in the blood is connected with fevers of the inflammatory or typhoid form.

A paper was also in part read, entitled, "Researches on the Tides," Ninth Series; by the Rev. W. Whewell, M.A., F.R.S., &c.

about another inclined at any angle to the former; and also a new, and comparatively concise, demonstration of the equations of the motion of rotation of a solid body, its centre of gravity being fixed, and the body being acted on by any forces.

The Society then adjourned over Whitsun-week to meet again on the 11th June next.

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His Royal [illegible] Sussex, K.G., President, [illegible].

A paper was read, entitled, "Researches on Suppuration." By George Gulliver, Esq., Assistant Surgeon to the Royal Regiment of Horse Guards. Communicated by [illegible] M.D., F.R.S., &c.

The author, in consequence of some theoretical views, [illegible] is that different forms [illegible] [illegible] and the [illegible] and the [illegible] or [illegible] in [illegible] tissue, [illegible] where [illegible] and, [illegible] of the [illegible] of [illegible] and partly [illegible] of [illegible] of the globules of the blood, [illegible] water, by which [illegible] the red globules were made to [illegible] [illegible] at the bottom of the fluid, and were [illegible]. A number of [illegible] the [illegible], was [illegible], that [illegible] a kind of [illegible] analysis of the blood. [illegible] of the part [illegible] of the blood, [illegible] [illegible] Such is the [illegible] when mixed with [illegible], it [illegible] and [illegible] was the inflammatory or typhoid form.

A paper was also in part read, entitled, "Researches on the Tides. Ninth Series;" by the Rev. W. Whewell, M.A., F.R.S., &c.